POSITIONS AND AREAS OF SUN SPOTS—Continued

Date	Eastern standard civil time	Heliographic			Area		Total area for each day
		Diff. long.	Longitude	Latitude	Spot	Group	
1930	h m	°	°	°			
Nov. 28 (Naval Observatory)	12 5	−51.5	31.0	+7.0		93	
		−33.5	49.0	+17.5		46	
		−21.5	61.0	+8.0		108	
		−9.5	73.0	+16.5		22	
		+22.0	104.5	+5.5		31	
		+23.0	105.5	−9.0		340	
		+55.5	138.0	−7.0		46	686
Nov. 29 (Naval Observatory)	11 40	−37.0	32.5	+7.0		77	
		−21.0	48.5	+19.5		31	
		−8.5	61.0	+8.0		93	
		+10.0	79.5	+14.5		77	
		+35.0	104.5	+16.0		37	
		+35.5	105.0	−9.0		324	639
Nov. 30 (Mount Wilson)	13 30	−19.0	36.4	+8.0		42	
		−1.0	54.4	+17.0		1	
		+7.0	62.4	+9.0		27	
		+25.0	80.4	+15.0		101	
		+50.0	105.4	−9.0		374	
		+51.0	106.4	+6.0	2		547
Mean daily area for November							472

PROVISIONAL RELATIVE SUN-SPOT NUMBERS FOR NOVEMBER, 1930 [1]

[Data furnished through the courtesy of Prof. W. Brunner, University of Zurich, Switzerland]

November, 1930	Relative numbers	November, 1930	Relative numbers	November, 1930	Relative numbers
1	57	11	8	21	dd 66
2	41	12	14	22	70
3	25	13	0	23	68
4	27	14	12	24	a 51
5	16	15	d 14	25	Wc 58
6	8	16		26	Eabc 76
7	8	17	26	27	72
8	9	18	d 31	28	67
9	8	19	b	29	61
10	15	20	61	30	54

Mean, 28 days=36.5.

[1] Dependent alone on observations at Zurich and its station at Arosa.

a=Passage of an average-sized group through the central meridian.
b=Passage of a large group through the central meridian.
c=New formation of a large or average-sized center of activity: E, on the eastern part of the sun's disk; W, on the western part; M, in the central zone.
d=Entrance of a large or average-sized center of activity on the east limb.

AEROLOGICAL OBSERVATIONS

By L. T. SAMUELS

Free-air temperatures during November were considerably above normal at Ellendale, moderately above at Royal Center, slightly below at Broken Arrow and moderately below at Groesbeck and Due West. (See Table 1.) This is in close agreement with the distribution of surface departures shown in Chart I.

The departures of free-air relative humidities were in general, of opposite sign to those of temperature.

Free-air vapor pressures were above normal at all levels at Ellendale, Royal Center, and Broken Arrow and in the upper levels at Due West and Groesbeck.

From Table 2, it will be noted that free-air temperatures at the naval air station, Pensacola, were in close agreement with those at Groesbeck, being slightly higher at the former station. Those at San Diego were highest of all stations.

At 1,000 meters above sea level the free-air resultant winds indicated a southwesterly component over the middle Mississippi Valley and lower Lake region and northwesterly and westerly over the remainder of the country. At 3,000 meters none of the resultant directions contained an appreciable southernly component, except in the extreme Northwest. The easterly component found at 1,000 meters over Brownsville and Key West changed to westerly at 2,000 meters over Brownsville and to north-northwesterly at 3,000 meters over Key West. The monthly resultants for a representative group of stations are shown in Table 3.

A very severe sleet storm occurred at Ellendale on the 18th, 19th, and 20th. The kite record of the 18th was of unusual interest in that it showed a marked rise in temperature from the 17th to 18th between 3,000 and 3,500 meters. The increase amounted to 7° C. at the higher level and was unquestionably greater at still higher elevations beyond the limit of the flight. A significant feature of this high inversion was the fact that the air within it was saturated and 10-tenths altostratus clouds from the south-southeast prevailed. On the morning of the 18th a deep LOW (29.3 in.) was central over Colorado.

TABLE 1.—*Free-air temperatures, relative humidities, and vapor pressures during November, 1930*

Altitude (meters) m. s. l.	Broken Arrow, Okla. (233 meters)		Due West, S. C. (217 meters)		Ellendale, N. Dak. (444 meters)		Groesbeck, Tex. (141 meters)		Royal Center, Ind. (225 meters)	
	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal	Mean	Departure from normal
TEMPERATURE (° C.)										
Surface	8.2	−1.5	7.7	−2.9	0.6	+2.9	10.0	−3.2	5.4	+0.7
500	8.3	−0.3	7.2	−2.4	0.7	+3.0	10.9	−1.5	4.3	+1.2
1,000	7.7	+0.3	6.0	−1.9	2.7	+4.6	9.5	−1.7	2.8	+1.2
1,500	5.7	−0.7	4.9	−1.5	2.5	+4.7	7.8	−1.8	1.5	+1.2
2,000	3.8	−0.9	3.1	−1.6	0.7	+4.5	5.9	−1.8	0.4	+1.9
2,500	1.4	−1.1	0.8	−2.1	−1.6	+4.4	2.9	−2.7	−1.9	+1.5
3,000	−0.7	−0.8	−2.0	−2.7	−4.3	+4.3	0.3	−2.9	−4.4	+1.3
4,000	−8.8	−4.0	−8.0	−3.2	−9.6	+4.7	−6.1	−3.9	−10.2	+0.3
5,000					−15.4	+4.2				
RELATIVE HUMIDITY (%)										
Surface	68	+1	74	+3	70	−8	75	+1	73	0
500	64	0	68	+2	69	−7	59	−8	70	−2
1,000	58	−1	63	+1	57	−8	51	−8	65	−2
1,500	55	+3	57	0	51	−7	43	−9	52	−7
2,000	53	+6	54	+2	50	−5	45	−1	44	−10
2,500	48	+5	48	+4	53	−1	46	+6	40	−10
3,000	45	+3	59	+18	56	+2	43	+7	40	−9
4,000	45	+10	65	+30	54	−2			36	−9
5,000					54	+4				
VAPOR PRESSURE (*mb.*)										
Surface	7.80	−0.42	8.79	−0.85	4.37	+0.13	10.34	−1.69	7.73	+1.13
500	7.47	+0.07	7.97	−0.53	4.32	+0.16	8.74	−1.79	6.89	+1.05
1,000	6.39	+0.16	6.85	−0.34	4.09	+0.53	6.81	−1.70	5.79	+0.97
1,500	5.25	+0.20	5.69	−0.06	3.60	+0.52	4.88	−1.69	4.18	+0.37
2,000	4.48	+0.56	4.77	+0.28	3.04	+0.43	4.38	−0.51	3.21	+0.17
2,500	3.47	+0.42	4.04	+0.84	2.66	+0.45	3.69	−0.11	2.49	+0.02
3,000	2.75	+0.29	4.31	+1.87	2.25	+0.44	3.09	+0.33	2.25	+0.09
4,000	1.61	+0.27	3.63	+2.51	1.47	+0.28			1.89	+0.63
5,000					0.91	+0.20				

TABLE 2—*Free-air data obtained at naval air stations during November, 1930*

Altitude (meters) m. s. l.	TEMPERATURE (° C.)		RELATIVE HUMIDITY (%)	
	Pensacola, Fla.	San Diego, Calif.	Pensacola, Fla.	San Diego, Calif.
Surface	11.3	19.1	82	81
500	10.4	17.6	76	48
1,000	9.0	16.6	72	42
2,000	6.2	10.7	61	38
3,000	2.6	5.0	46	35